4-20mA Transmitter Receiver

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FORBIX SEMICON

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4-20mA Transmitter Receiver Units

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Introduction

4-20mA transmitter receiver system works on the principle of converting analog signals to wireless RF communication protocol. The input current within limits of 0-20mA is converted linearly to analog voltage. The analog voltage is then converted to 10-bit ADC value. The 10-bit value is then encoded, packetized and sent over air to corresponding receiver. The far end receiver captures the wireless signals and converts it back to current values (similar to the transmitter).

The transmitter uses FBXMR12 / FBXMR23 RF modules. The receiver unit used FBXMR12 receiver module. FBXMR23 is high power transmitter unit and FBXMR12 is medium power transmitter unit. FBXMR12 also serves as receiver unit.

Details of FBXMR23 at: http://www.forbixindia.com/docs/FBXMR23.pdf

Details of FBXMR12 at: http://www.forbixindia.com/docs/FBXMR12.pdf

The complete module information viz. operating frequency, operating voltage, modes of operation are available in the above documents.

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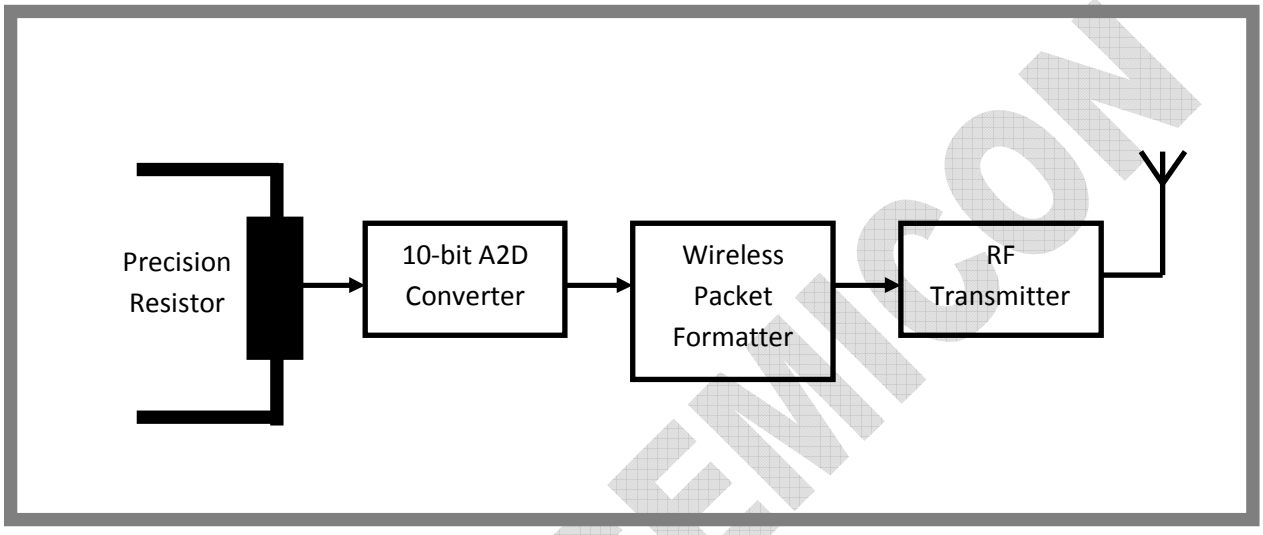
Internal Architecture of the Transmitter

The transmitter consists of 4 main components:

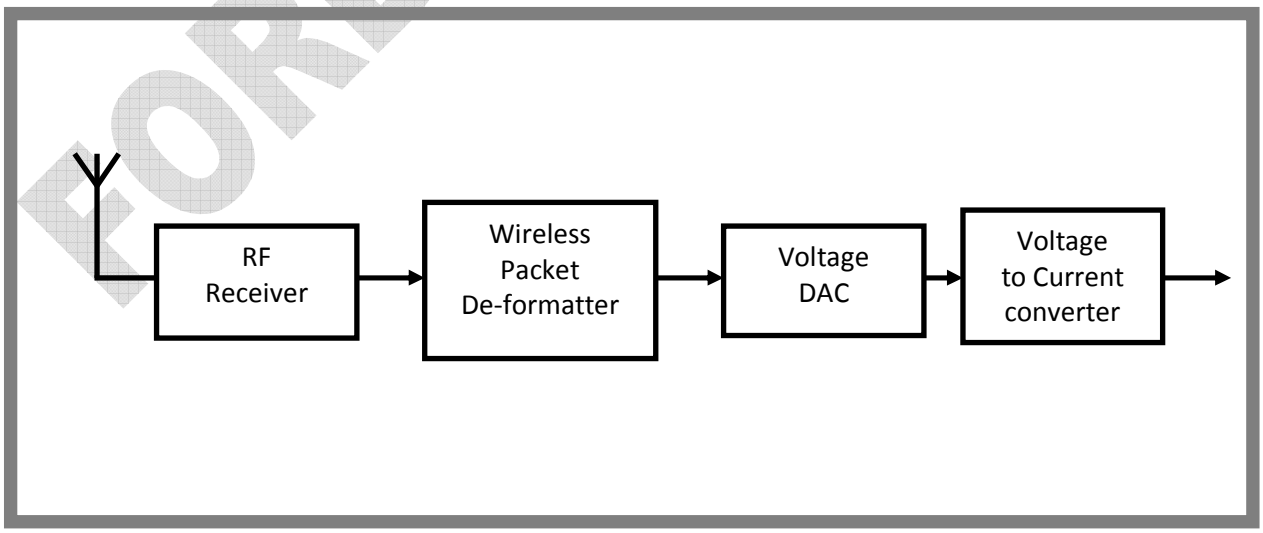
1) Current to voltage converter
2) Analog voltage to digital data (10-bit ADC)
3) Wireless packet formatter
4) RF transmitter



Internal Architecture of the Receiver

The receiver consists of 4 main components:

1) Wireless RF receiver
2) Packet de-formatter
3) Data packets to voltage converter
4) Voltage to current converter



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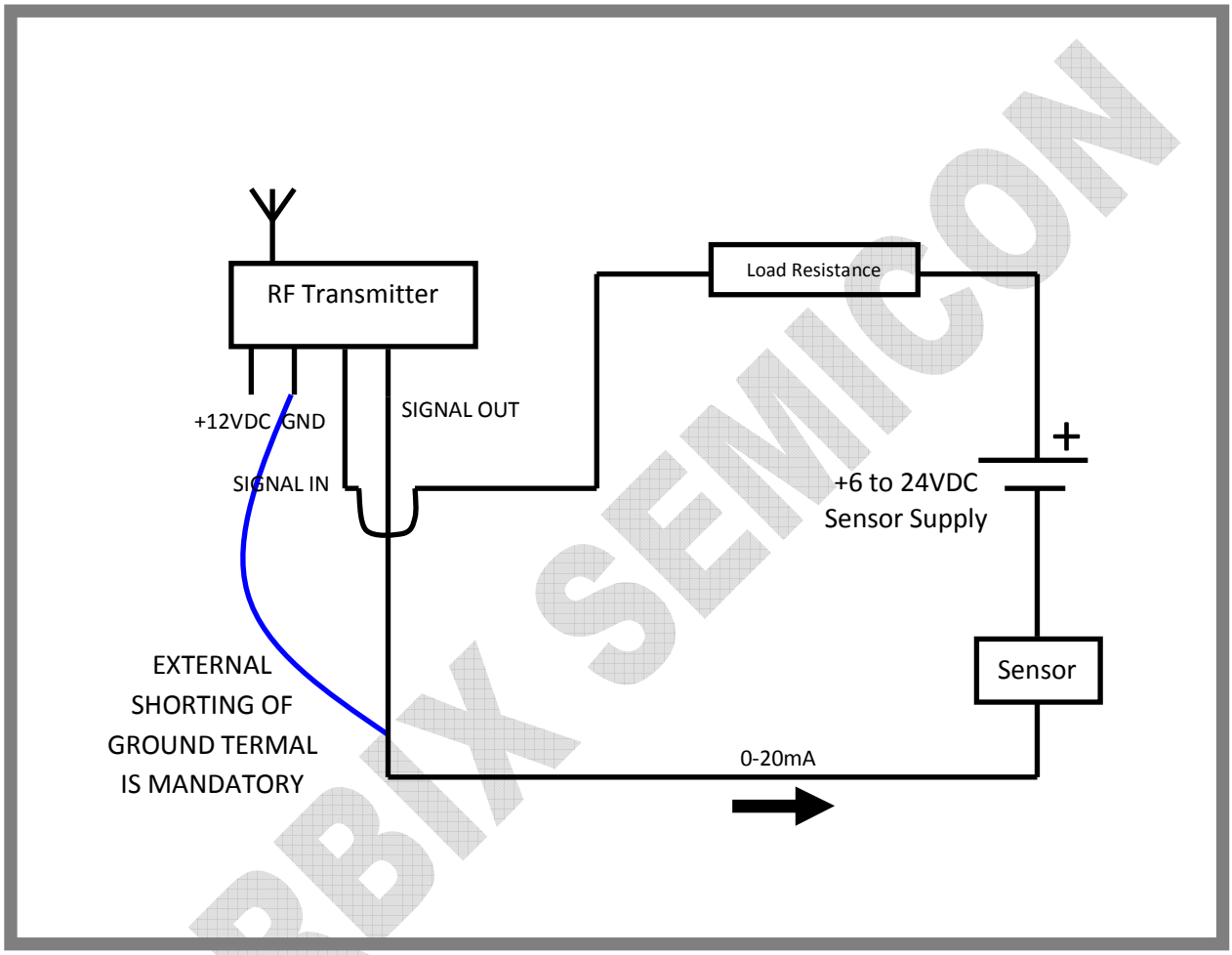
Connection Diagram for the transmitter

Connection diagram of the transmitter unit



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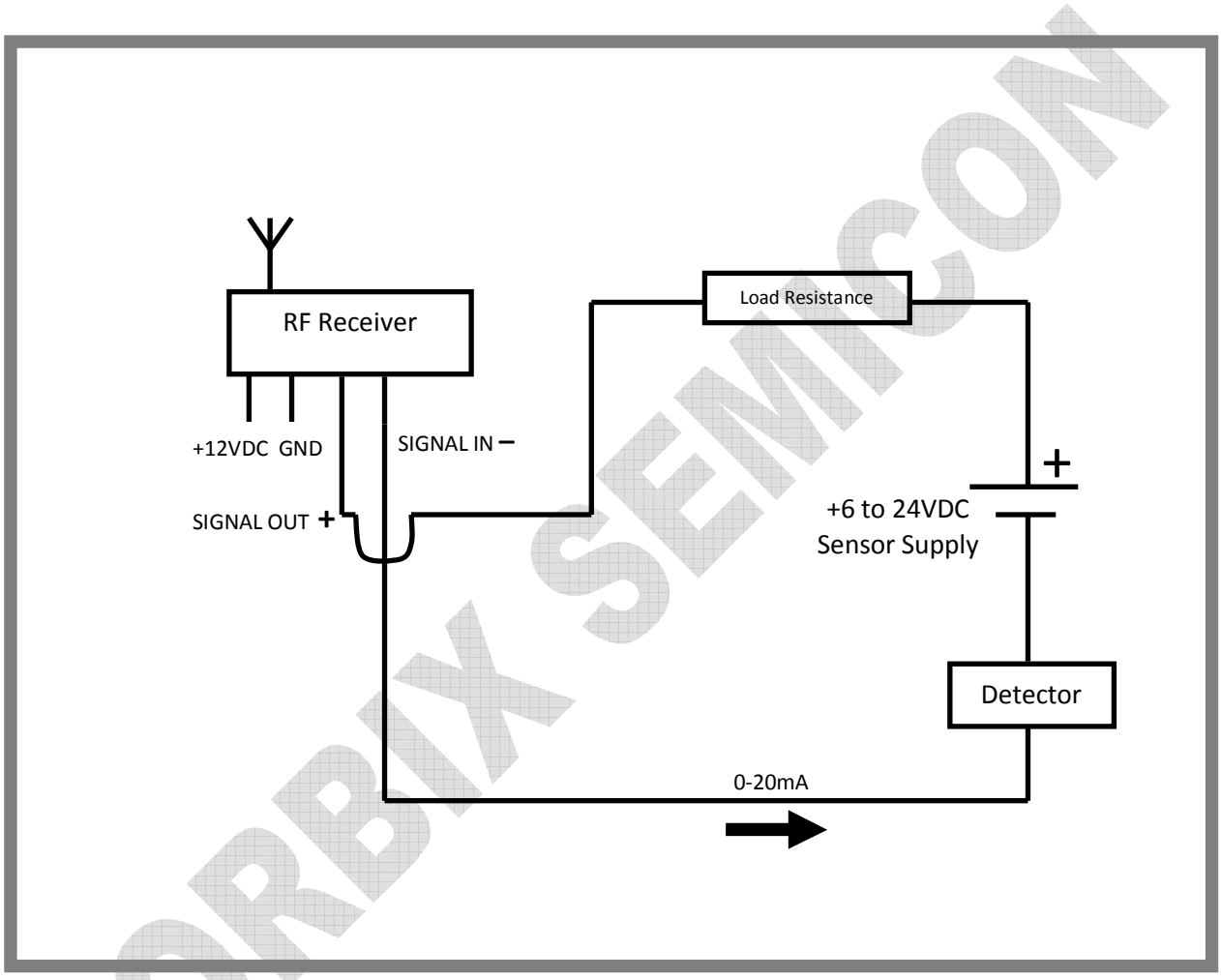
The 0-20mA or 4-20mA current flowing through the sensor is captured by the internal precision resistor of the RF transmitter unit. The running current poses a potential drop across the resistor, that is sampled by the internal circuits and the value is then transmitted over air to the receiver. The transmitter unit has 2 LEDs for indication.

Yellow: Power ON indication

Red: Transmission indication

Connection Diagram for the receiver

Connection diagram of the receiver unit



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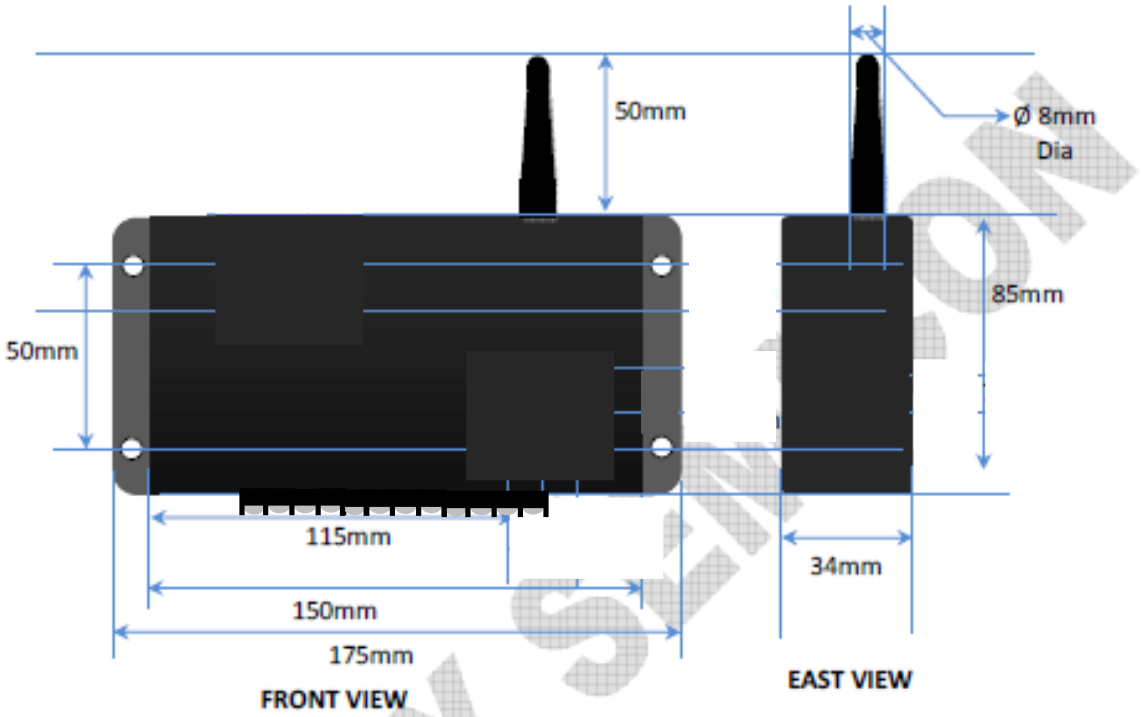
Once the signal is captured by the receiver, the digital signals are converted to analog current output that flows through the 0-20mA detector. The current through the detector is same as the current captured at the transmitter (flowing through the 2-wire sensor).

Yellow: Power ON indication

Red: Reception indication

Dimension



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Safety Instructions

Information for Your Own Safety

This manual does not contain all of the safety measures for operation of this equipment (module or device) because special operating conditions, local code requirements or local regulations may necessitate further measures. However, it does contain information which must be adhered to for your own personal safety and to avoid damage to the equipment. This information is highlighted by a warning triangle with an exclamation mark or a lightning bolt depending on the severity of the warning. After removing the packaging make sure the integrity of the unit. If in doubt don't use the equipment and contact technical staff. If this machine required electrical installation, then mounting of electric appliances must be carried out only by skilled electricians. It is imperative to observe the generally applicable safety measures. In case of failure and /or malfunctioning of the device, turn off it. For any repair only contact technical staff. Failure to comply with the above may compromise the device safety.

Radio Antenna

If the machine contains radio antenna – then NEVER DISMANTLE OR UNWIND THE ANTENNA FROM THE SYSTEM (especially when the machine powered ON). It will permanently damage the radio controller and RF circuits

Physical Damage

Our electronic machines are fragile. Do not drop the system on hard floor or surface. It would cause physical damage to the enclosure and internal circuits.

Warning

Means that failure to observe the instruction can result in death, serious injury or considerable material damage. This equipment DOES NOT CONTAIN HAZARDEOUS VOLTAGE, AND IS SAFE TO OPERATE.

Caution

Means hazard of electric shock and failure to take the necessary safety precautions will result in death, serious injury or considerable material damage. This equipment DOES NOT CONTAIN HAZARDEOUS VOLTAGE, AND IS SAFE TO OPERATE.

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Operating Temperature

Operating temperature of the system is +10°C to +60°C. Beyond this temperature, there is a possibility that the radio circuits will drift from actual function specifications. Store in cool and dry place

Qualified personnel

Installation and operation of this equipment described in this manual may only be performed by qualified personal.

Only people that are authorized to install, connect and use this equipment and have the proper knowledge about labelling and grounding electrical equipment and circuits and can do so according to safety and regulatory standards are considered qualified personnel in the manual. MAKING IMPROPER CONNECTIONS MAY LEAD TO MACHINE FAILURE OR BURN-OUT. Read instructions carefully before installation.

Battery Replacement

If the machine contains batteries, then remove the batteries when the system is not expected to be used for more than 2-3 months. DO NOT recharge the batteries (keeping them connected to the machines). Replace dead / expired batteries immediately

Use for the intend purpose

The equipment (device, module) may only be used for the application cases specified in the Catalogue and the user manual and only in connection with devices and components recommended and approved by FORBIX SEMICON

Exclusion of liability

We have checked the contents of this publication and every effort has been made to ensure that the descriptions are as accurate as possible. However, deviations from the description cannot be completely ruled out, so that no liability can be accepted for any errors or omissions in the information given. The data in this manual is checked regularly and the necessary corrections will be included in subsequent editions. If you have any suggestions, please let us know via email at:

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